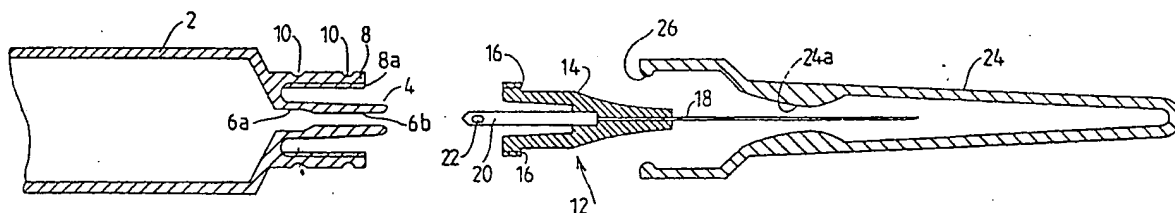




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(54) Title: SYRINGES**(57) Abstract**

A syringe, comprising a syringe body (2) with a tip (4), a needle hub (12) engageable on the tip (4), and a plug (20) within the tip (4) being movable in response to inwards movement of the needle hub (12) along the tip (4) to a position in which fluid is able to pass through the tip (4) either to or from the needle (18).

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"SYRINGES"

The present invention relates to syringes and more particularly to disposable syringes.

It is common practice for disposable syringes to be supplied with the syringe body already filled with the product to be injected. The syringe may be supplied with the needle fitted onto a luer tip, with a plastics or rubber sheath being provided around the needle for protection. Unless precautions are taken, there is a risk that product may leak from the syringe body into the sheath during storage.

One previously proposed means of positively preventing leakage of product prior to use is to provide a diaphragm seal at the outlet from the syringe body, the diaphragm being ruptured immediately prior to use of the syringe. Although a diaphragm provides a very effective seal, there is a risk that the product will become contaminated by particles of the ruptured diaphragm.

Another previously proposed method of positively preventing leakage is to mount a plug on the luer tip to

seal the outlet, with the needle and sheath being mounted on the plug, and adhesive tape being wrapped around the plug, the syringe body, and the sheath in order to ensure that these components are kept together during storage. In order to set-up the syringe for use, the tape is unwrapped to enable the assembly formed by the plug, needle, and sheath to be removed from the luer tip; the plug is then discarded, and the needle within the sheath is mounted directly on the luer tip, the sheath then being removed in order to expose the needle. Although the removable plug provides an effective means of sealing the syringe body, the procedure required to set-up the syringe for use is rather cumbersome. In addition, the plug, which is a relatively bulky member, leads to increased production costs.

According to the present invention there is provided a syringe comprising a syringe body with an outlet tip, a needle having a hub engageable on the tip, and plug means within the tip, said plug means being movable in response to inwards movement of the hub along the tip from a position in which the plug means blocks the tip whereby to prevent passage of fluid through the tip to a position in which fluid is able to pass through the tip.

Embodiments of the invention will now be described by way of example only, with reference to the accompanying drawings, in which:-

Figure 1 is a longitudinal exploded section showing a first embodiment of syringe;

Figure 2 is a longitudinal section showing the syringe in its storage mode;

5 Figure 3 is a longitudinal section showing the syringe in its use mode prior to removal of the sheath; and

Figure 4 is a longitudinal exploded section of a modified embodiment of the syringe.

10 As shown in Figures 1 to 3, the syringe of the first preferred embodiment comprises a body 2 with a luer tip 4. The bore of the luer tip is stepped, with a larger diameter portion 6a adjacent the syringe body and a smaller diameter portion 6b leading from the discharge
15 end of the tip 4, the portions 6a, 6b being interconnected by a conical transition portion. The smaller diameter portion 6b may be of constant diameter along its length or it may have a slight taper in a direction towards the larger diameter portion. The luer
20 tip 4 is concentrically surrounded by a collar or shroud 8 having on its inner surface a thread 8a and having on its outer surface a pair of axially spaced location grooves 10.

A needle hub 12 which fits on the luer tip 4
25 comprises a hub body 14 with lugs 16 projecting from the rear end of the body to engage in the internal thread 8a

of the collar 8. A needle 18 extends from the forward end of the hub body 14 and a tubular plug 20 is mounted in the interior of the hub body 14, the plug 20 being a friction fit within the smaller diameter bore portion 6b
5 portion of the luer tip 4. The plug 20 is open at its forward end to communicate with the rear end of the needle 18, and the rear end of the plug 20 is closed, an inlet orifice 22 being formed in the side wall of the plug 20 in order to permit fluid flow into the plug 20
10 and thence into the needle 18. The hub 12 and needle 18 are housed within a sheath 24 provided at its inner end with an inwardly-directed annular lip 26 arranged to locate in one or other of the two annular grooves 10 formed on the outer surface of the collar 8. The
15 forward end portion of the hub body 14 is a friction fit within a reduced-diameter portion 24a of the sheath 24.

When the assembly formed by the hub 12, the needle 18, and the sheath 24 is located on the syringe body at such an axial position that the lip 26 on the sheath 24
20 is engaged within the outer one of the two annular grooves 10 on the collar 8, the rear end portion of the plug 20 is within the smaller diameter bore portion 6b of the luer tip whereby the side inlet orifice 22 of the plug 20 is blocked. This position is shown in Figure 2.
25 In this position, the plug 20 acts as a seal to prevent discharge of the contents from the syringe body 2. This constitutes the storage mode of the syringe. When the assembly is moved axially so that the lip 26 on the sheath 24 engages within the inner of the two annular
30 grooves 10 on the collar 8, the side inlet orifice 22 in

the plug 20 is located within the larger diameter bore portion 6a of the luer tip and is open to permit fluid flow into the plug 20 and thence into the needle. This condition is shown in Figure 3. Accordingly, when it is required to change the syringe from its storage mode to its mode for use, all that is required is to rotate the sheath 24 so that the needle hub 12 and plug 20 move inwardly due to the interaction between the hub lugs 16 and the internal thread 8a of the collar 8, until the lip 26 on the sheath engages into the inner groove 10 on the collar thereby signifying that the plug is in its open position. The sheath is then withdrawn axially in order to expose the needle for use.

The syringe shown in Figures 1 to 3 may be used not only for injection of a product, but also for withdrawal of blood or other fluid from the body, the withdrawn fluid being sealed within the syringe body upon subsequent movement of the plug to its closed position.

In a modified embodiment shown in Figure 4, the plug 20 is separate from the needle hub 12, but projects from the forward end of the luer tip 4 into the interior of the hub body 14. In the storage mode, the free, outer, end of the plug 20 is clear of the bottom of the cavity within the hub body 14, with the inlet orifice 22 of the plug being positioned in the reduced diameter bore portion of the luer tip in order to provide a seal. As the needle hub is moved inwardly along the luer tip 4 by rotating the sheath, the free end of the plug 20 is engaged by the bottom of the hub cavity and the plug 20

is thereby pushed into a position in which its inlet orifice 22 is within the larger diameter portion 6a of the tip bore and fluid can thereby pass via the plug into the needle.

- 5 In a modification, instead of having a stepped bore, the tip may have a bore which converges towards the outer end of the tip, with the plug being of a complementary convergent form.

10 The syringes of the preferred embodiments are relatively easy to set up for use, provide an effective seal in the storage mode and are relatively inexpensive to produce.

15 The syringe body, including the luer tip and the surrounding collar, the plug, and the needle hub are preferably moulded from plastics.

 The embodiments have been described by way of example only and modifications are possible within the scope of the invention.

CLAIMS:-

1. A syringe comprising a syringe body with an outlet tip, a needle having a hub engageable on the tip, and plug means within the tip, said plug means being movable in response to inwards movement of the hub along the tip from a position in which the plug means blocks the tip whereby to prevent passage of fluid through the tip to a position in which fluid is able to pass through the tip.
2. A syringe as claimed in claim 1, wherein the plug means is mounted on the needle hub so as to be moveable with the hub.
3. A syringe as claimed in claim 1, wherein the plug means is separate from the hub and is engageable by the hub during inwards of the hub movement along the tip.
4. A syringe as claimed in any one of claims 1 to 3, wherein the tip comprises a stepped bore having a reduced diameter portion opening to the outer end of the tip, and a larger diameter portion opening to the syringe body, and the plug means has an inner end portion located substantially within the reduced diameter bore portion when the plug means is positioned to block the tip, said inner end portion of the plug means being movable into the larger diameter bore portion to permit passage of fluid through the tip.

5. A syringe as claimed in claim 4, wherein the plug means comprises a tube open at its outer end to communicate with the hub, and closed at its inner end, the tube having an inlet orifice in its side wall at the inner end portion of the tube, the orifice, when within the reduced diameter bore portion of the tip, being blocked by the side wall of that portion, and the orifice being open to permit ingress of fluid when within the larger diameter bore portion.

6. A syringe as claimed in any one of claims 1 to 3, wherein the tip comprises a bore which is convergent in a direction towards the outer end of the tip, the plug having a body of a complementary convergent form to that of the bore.

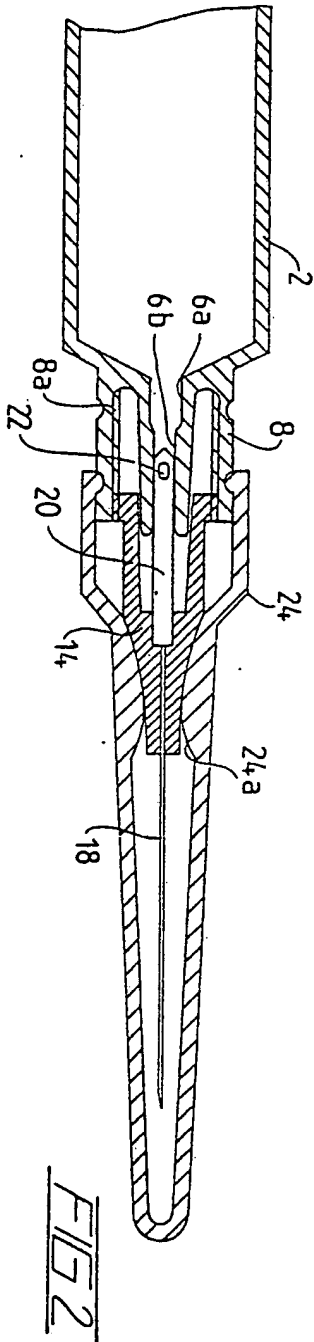
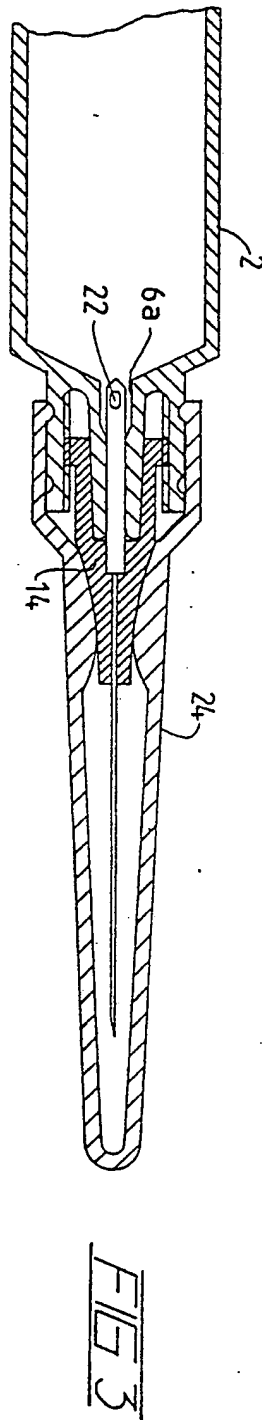
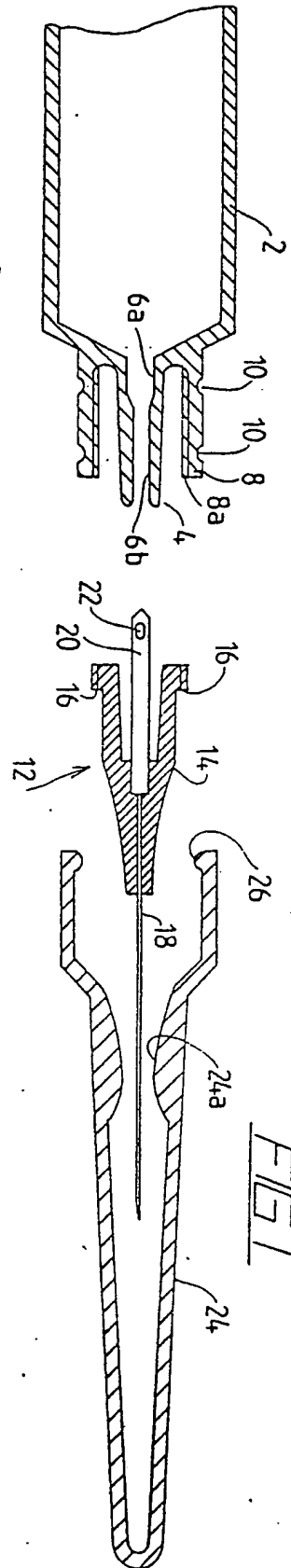
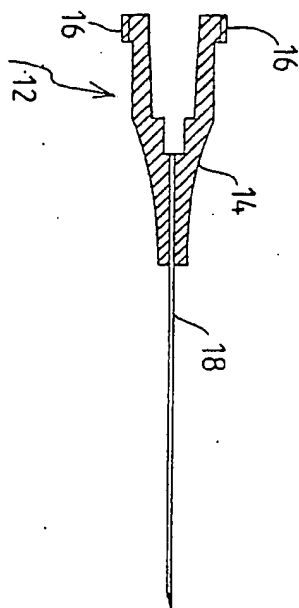
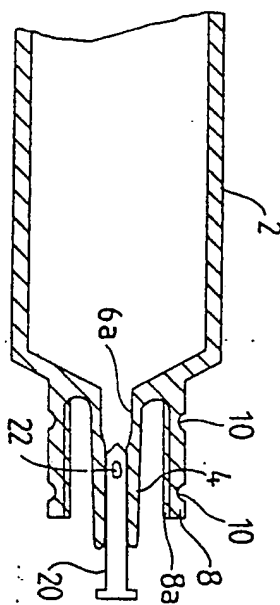
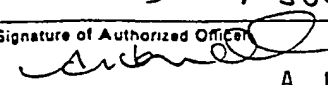


FIG 4



INTERNATIONAL SEARCH REPORT

International Application No PCT/AU 85/00068

I. CLASSIFICATION OF SUBJECT MATTER (If several classification symbols apply, indicate all) *		
According to International Patent Classification (IPC) or to both National Classification and IPC		
Int. Cl. ⁴ A61M 5/31, 5/32		
II. FIELDS SEARCHED		
Minimum Documentation Searched *		
Classification System :	Classification Symbols	
IPC	A61M 5/31, 5/32	
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AU: IPC as above		
III. DOCUMENTS CONSIDERED TO BE RELEVANT *		
Category *	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No ¹³
X	AU, A, 56212/65 (CIBA LIMITED) 15 September 1966 (15.09.66)	1-6
Y	AU, A, 29647/67 (LAPIS ENGINEERING COMPANY LIMITED) 15 May 1969 (15.05.69)	1-6
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IV. CERTIFICATION		
Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report	
1 July 1985 (01.07.85)	(09.07.85) 9 JULY 1985	
International Searching Authority	Signature of Authorized Officer	
Australian Patent Office	 A. HENDRICKSON	

ANNEX TO THE INTERNATIONAL SEARCH REPORT ON
INTERNATIONAL APPLICATION NO. PCT/AU 85/00068

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